

15¢

\$5.50 A YEAR

November 5, 1955

VOL. 12 NO. 17 PAGES 249-254

# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Virus Synthesis

See Page 249

A SCIENCE SERVICE PUBLICATION

A GIANT FOR ITS SIZE !



## Telephone science produces an important new rectifier

At Bell Laboratories one line of research is often fruitful in many fields. Latest example is the silicon power rectifier shown above.

Product of original work with semi-conductors—which earlier created the transistor and the Bell Solar Battery—the new rectifier greatly reduces the size of equipment needed to produce large direct currents. It is much smaller than a tube rectifier of equal performance and it does not require the bulky cooling equipment of other metallic rectifiers.

In the Bell System the new rectifier will supply direct current more economically for telephone calls. It can also be adapted to important uses in television, computers, industrial machines, and military equipment. Thus, Bell Telephone Laboratories research continues to improve telephony—while it helps other fields vital to the nation.

**BELL TELEPHONE LABORATORIES**



IMPROVING TELEPHONE SERVICE FOR AMERICA PROVIDES  
CAREERS FOR CREATIVE MEN IN SCIENTIFIC AND TECHNICAL FIELDS



Above, new rectifier (held in pliers) is contrasted with comparable tube rectifier and its filament transformer, rear. Mounted on a cooling plate, lower center, the new rectifier can easily supply 10 amperes of direct current at 100 volts, that is, 1000 watts—enough to power 350 telephones.

## ASTRONOMY

# Astronomy Highlights

**Preparation for launching of small artificial satellite as part of International Geophysical Year heads list of ten top events as picked by Dr. Harlow Shapley.**

► THE TOP astronomical highlights of 1955 have been picked by Dr. Harlow Shapley, former director of Harvard College Observatory, Cambridge, Mass.

Included among the ten most important events, in or near the astronomical field, Dr. Shapley selected:

1. Announcement that the U. S. Government would sponsor launching of at least one small, artificial satellite during the International Geophysical Year, which starts July 1, 1957. Government backing for the project includes both the necessary money and scientific manpower.

The small moonlet will girdle the globe every few hours, reporting on what this

planet does to missiles and meteorites at and altitude of 200 to 300 miles.

2. Detection of "thunderbolts of Jove" or some similar strong electrical effect in the atmosphere of Jupiter by Drs. Bernard F. Burke and Kenneth L. Franklin of the Carnegie Institution of Washington.

They discovered the radio waves from Jupiter, the first to be found from another planet in the solar system, using a radio telescope located at Seneca, Md. The radio noise outbursts have been verified by Australian observers. This is but one of the "many remarkable developments" in radio astronomy, Dr. Shapley said.

Among others are the explorations of the

Milky Way being made at Leiden, The Netherlands; Sydney, Australia; Ohio State University and Harvard; the building in half a dozen countries of several large "dishes" for receiving radio waves from beyond the earth's atmosphere, and the approach toward completion of the 250-foot radio telescope at Manchester, England.

3. Discovery of the star of smallest known mass—only one-twelfth that of the sun—by Miss Sarah Lee Lippincott of Sproul Observatory, Swarthmore, Pa. Dr. Walter Baade of Mt. Wilson and Palomar Observatories photographed the stellar lightweight, one component of a dwarf reddish double star, separate from its primary, by aiming the 200-inch telescope exactly where Miss Lippincott calculated Ross 614-B would be.

4. Renewal of discussion concerning who owns the upper air and who has the right of way in space beyond the upper air—all in connection with the launching of a man-made moonlet, sometimes called the MOUSE, for Minimum Orbital Unmanned Satellite, Earth.

5. Conclusion of a 50-year research program by many Harvard astronomers on variable stars of the Magellanic Clouds, closest galaxies outside our own Milky Way. The analysis included 3,000 variable stars, three-fourths of which are Cepheids. For 1,220 of them, periods and light curves have been determined.

6. Positive identification of the strong yellow line in the sun's corona as that of calcium XV, caused by calcium atoms stripped by ionization of 14 of their 20 electrons. It was identified by Dr. Walter O. Roberts and his associates at the University of Colorado's High Altitude Observatory, and Dr. David Layzer of Harvard.

7. The report by Dr. E. C. Slipher of Lowell Observatory, Flagstaff, Ariz., on his 10,000 excellent photographs of the planet Mars, made during 1954, when Mars was relatively close to the earth, with the University of Michigan's telescope on Naval Hill, Bloemfontein, South Africa.

A report by Audouin and Charles Dollfus, a French father and son scientific team, on their photoelectric observations, made from a balloon four and a half miles above the earth's surface, of the small moisture content of the Martian atmosphere.

8. Appearance of the first section of the two-color star and galaxy atlas, made with the 48-inch Schmidt telescope under the auspices of Mt. Wilson and Palomar Observatories and the National Geographic Society, with technical assistance from Eastman Kodak Company's research laboratories.

9. Occurrence on June 20 of a solar eclipse with the greatest duration of totality, 7 minutes 7.8 seconds, since June, 717 A.D., 1,238 years ago. It will be nearly 200 years before such a long eclipse occurs again.

10. An explanation by Dr. C. F. von Weizsaecker of the reason for the sphericity of globular clusters and their freedom of interstellar dust and gas. His theory is the dust and gas have been cleaned out by frequent passage of the clusters through nebulosities in the Milky Way.

Science News Letter, November 5, 1955



**ATOMIC RAY DETECTORS**—Overcoming disadvantages of conventional detectors, this new wide-angle atomic ray detector developed by General Electric scientists is used to monitor radioactive material being removed from flatbed trucks with caustic steam.

## CHEMISTRY

# Live Virus Synthesized

Major advance in fight against disease is also step toward the synthesis of life elements and the development of virus antigens to combat virus disease.

## See Front Cover

► A MAJOR milestone in the fight against virus diseases and a step toward the synthesis of such key life chemicals as chromosomes, the controllers of inheritance, were reported by two University of California at Berkeley scientists.

In a paper in the *Proceedings of the National Academy of Sciences* (Oct.), Drs. Heinz L. Fraenkel-Conrat and Robley Williams described experiments of far-reaching impact in science. These scientists claim their work is the first partial synthesis of a virus.

It is the first time a self-duplicating system (a property usually attributed to living things) has been assembled in the test tube from inactive materials, the California scientists state.

It is the first time inert fragments of viruses have been put together to form active viruses capable of causing rampant disease.

In their experiments, the scientists separated tobacco mosaic viruses into their two main component chemicals, protein and nucleic acid. They tested the two parts, and determined that neither could cause infection. Both were inactive.

Dr. Fraenkel-Conrat, by chemical means, was able to obtain virus nucleic acid that was seemingly undamaged, a feat not previously achieved. After the two components were put together, viruses were reformed. Not only was the activity of the reconstituted viruses shown by infection of tobacco plants; in addition, electron microscope photographs showed that the recombined viruses had been formed from fragments of the two original components.

The electron microscope photographs seen on the cover of this week's *SCIENCE NEWS LETTER* show how tobacco mosaic viruses were rebuilt from inert fragments into active disease-producing viruses.

The left photo shows small fragments of the protein fraction of the virus. Close inspection reveals that these are doughnut-shaped. Their molecular weight is about 400,000. These fragments cannot cause disease.

The photo on the right shows long rods which are actually rebuilt, disease-producing viruses. The rods are protein, and were formed from the doughnut-shaped fragments. Down the center of the rods, but invisible, run strands of nucleic acid, the second fraction of the virus.

The work opens up several approaches to an attack on virus diseases, as well as new investigations of some of the most basic biological problems, Drs. Fraenkel-Conrat and Williams point out.

First, it may be possible to "tailor" viruses by breaking them up and then recombining them in ways slightly different from the original. Such "tailor-made" viruses might give immunity but be incapable of causing disease.

Second, virus antigens might be developed, using virus fragments. Antigens stimulate production of antibodies, which in turn fight disease. Fragments of viruses, might bestow immunity to the whole virus.

Along other lines of investigation, the research offers an important avenue for the study of heredity in all living things. If one self-duplicating system can be made from inert material, it may be possible to reproduce other self-duplicating systems, such as chromosomes, the carriers of hereditary characteristics.

Another possibility is the eventual synthesis of viruses themselves. Dr. Wendell Stanley of the University of California, director of the Virus Laboratory, in which the work was done, said that fragments of about 20,000 molecular weight are within the range of chemical analysis of structure and ultimate synthesis. Fragments of this size are found in the broken viruses. It might be possible to make such fragments combine into another grouping of fragments in the 100,000 molecular weight range. These are the ones that go together to reconstitute the viruses.

In August, similar results were obtained in St. Louis and mentioned in September at the meeting of the American Chemical Society in Minneapolis as an addition to a paper by Dr. Barry Commoner of Washington University, St. Louis. (See *SNL*, Sept. 24, 1955, p. 198.)

The California team's first evidence for recombination of the virus was obtained in March of the present year. The research was supported by the National Foundation for Infantile Paralysis and the U. S. Public Health Service.

*Science News Letter*, November 5, 1955

## SEISMOLOGY

## Warn San Francisco Due for Big Quake

► ANOTHER BIG EARTHQUAKE, rivaling in intensity the one that destroyed San Francisco in 1906, is due to hit that area again soon.

Scientists cannot say exactly when, but they expect it to be a real earth-shaker. "Something's got to give," they say, and chances are the earthquake will be catastrophic when it occurs.

A slow horizontal creeping of one to

two inches per year has been measured along the San Andreas fault, a crack in the earth's surface that slices through California and Mexico.

The earth's crust can be stretched just so far, and seismologists believe that limit has about been reached along the San Andreas crack. Sooner or later there will have to be vertical motion to adjust to the horizontal stretching. The southern California earthquakes of 1952, large as they were, did not provide sufficient release of the accumulated strain.

The readjustment will involve a much greater energy release than in 1952.

*Science News Letter*, November 5, 1955

## SCIENCE NEWS LETTER

VOL. 68 NOVEMBER 5, 1955 NO. 19

The Weekly Summary of Current Science, published every Saturday by *SCIENCE SERVICE, Inc.*, 1719 N. St., N. W., Washington 6, D. C., North 7-2235. Edited by WATSON DAVIS. Subscription rates: 1 yr., \$5.50; 2 yrs., \$10.00; 3 yrs., \$14.50; single copy, 15 cents, more than six months old, 25 cents. No charge for foreign postage.

Change of address: Three weeks notice is required. When ordering a change please state exactly how magazine is now addressed. Your new address should include postal zone number if you have one.

Copyright, 1955, by Science Service, Inc. Reproduction of any portion of *SCIENCE NEWS LETTER* is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service. Science Service also publishes *CHEMISTRY* (monthly) and *THINGS of Science* (monthly).

Printed in U. S. A. Entered as second class matter at the post office at Washington, D. C., under the act of March 3, 1879. Acceptance for mailing at the special rate of postage provided for by Sec. 3440, P. L. and R., 1948 Edition, paragraph (d) (act of February 28, 1925: 39 U. S. Code 263) authorized February 28, 1930. Established in mimeographed form March 19, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Reader's Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

Member Audit Bureau of Circulation, Advertising Representatives: Howland and Howland, Inc., 1 E. 54th St., New York 22, Eldorado 5-5666, and 435 N. Michigan Ave., Chicago 11, Superior 7-6048.

## SCIENCE SERVICE

The Institution for the Popularization of Science organized 1921 as a non-profit corporation.

Board of Trustees—Nominated by the American Association for the Advancement of Science: Kirtley F. Mather, Harvard University; Paul B. Sears, Yale University; Karl Lark-Horowitz, Purdue University. Nominated by the National Academy of Sciences: Edward U. Condon, Berkeley, Calif.; Harlow Shapley, Harvard College Observatory; George W. Corcoran, Carnegie Institution of Washington. Nominated by the National Research Council: Ross G. Harrison, Yale University; Leonard Carmichael, Smithsonian Institution; Jerome Hunsaker, Massachusetts Institute of Technology. Nominated by the Journalistic Profession: Neil H. Swanson, Ruxton, Md.; O. W. Riegel, Washington and Lee University; Michael A. Gorman, Flint Journal. Nominated by the Scripps Estate: Edward J. Heaman, Memphis Press-Scimitar; John T. O'Rourke, Washington Daily News; Charles E. Scripps, Cincinnati, Ohio.

Officers—President: Leonard Carmichael; Vice President and Chairman of Executive Committee: Charles E. Scripps; Treasurer: O. W. Riegel; Secretary: Watson Davis.

Staff—Director: Watson Davis. Writers: Jane Stafford, Marjorie Van de Water, Ann Ewing, Horace Loffin, Howard Simons, Dorothy Schriver, Helen M. Davis. Science Clubs of America: Joseph H. Kraus, Margaret E. Patterson. Photography: Preston Davis. Production: Priscilla Howe, Marcia Nelson. Interlingua Division in New York: Alexander Gade, 80 E. 11th St., Gremercay 3-5416.



## NATURAL RESOURCES

**Use of Waterpower Called Drop in Bucket**

▶ WHILE ATOMIC ENERGY will supply much or most of the horsepower of the future, energy from falling water will continue to be a major and growing power source in the years ahead.

A report by the U. S. Geological Survey reveals that, though waterpower development has increased a phenomenal 564% since the first world-wide survey in 1920, the present energy coming from waterpower barely scratches the potential supply.

As of Dec. 31, 1954, the installed capacity of waterpower plants of the world was 130,000,000 horsepower. If all physically feasible sites were developed, the flow of the world's streams could produce about three billion horsepower, the Geological Survey estimates.

The United States on Dec. 31, 1954, had an installed capacity of about 35,000,000 horsepower, 27% of the world total. Its waterpower potential, based on mean water flow, is 116,000,000 horsepower, according to the survey.

Asia, Africa and South America show the greatest waterpower potential of all the continents on the basis of mean flow. Asia has a potential of 865,200,000 horsepower; Africa, 856,050,000; and South America, 625,000,000. In spite of its great energy-producing potential, however, Africa ranks lowest among the continents in actual installed capacity. It produces only 1,249,100 horsepower.

According to the survey, the so-called Chinese People's Republic has an installed waterpower capacity of only 3,500 horsepower, though it has a potential of 100,000,000 horsepower. The Asian section of the USSR has an actual capacity of 1,125,000 horsepower, and the European half, 6,000,000.

As more of these world-wide potential waterpower sites are developed, will their horsepower find a market? This same question was asked when the Grand Coulee dam was being built. The answer appears in that the market in that area has already far outstripped the supply. Even in the more isolated areas like Africa, stepped up ease and speed of communication, travel and transport make development and utilization more readily attainable.

Development of Lake Nyasa in Africa is a good example of technological barriers that pose the greatest problems to waterpower development.

Along its journey water from the lake drops 1,300 feet in 40 miles. But before this happens, the water must flow over 75 miles of sopping swampland. Until some method is found to route the water speedily over this 75-mile trap, at least 1,000,000 horsepower remains lost.

Science News Letter, November 5, 1955

There is evidence that *grapes* have been under cultivation and used for wine making as far back as 6,000 years ago.

## MEDICINE

**Earn Lasker Awards**

▶ TWO INDIVIDUALS and four groups or institutions will receive the Albert Lasker Awards in medicine and public health at the meeting of the American Public Health Association in Kansas City, Mo., on Nov. 17.

Discovery of anti-blood clotting drug, dicumarin, which is widely used for victims of heart attacks such as President Eisenhower's, won an award for Dr. Karl Paul Link of the University of Wisconsin at Madison.

Director of the laboratories which supplied most of the polio virus for the 1954 field trials of the Salk vaccine is the other winner of an individual award. He is Dr. Robert D. Defries of the Connaught Research Laboratories, University of Toronto, Canada.

Group awards went to:

Drs. C. Walton Lillehei, Morley Cohen, Herbert E. Warden and Richard L. Varco of the University of Minnesota, who originated the "cross-circulation" or "borrowed heart" surgical technique for the correction of congenital heart defects;

The Menninger Foundation and Clinic, Topeka, Kans., citing Drs. Karl A. and William C. Menninger for a "sustained and highly productive attack against mental diseases."

The Nursing Services of the U. S. Public Health Service, Washington, D. C., citing the Misses Lucile Petry Leone, Pearl McIver and Margaret Arnstein.

A team of tuberculosis researchers, Drs. Walsh McDermott and Carl Muschenheim, New York Hospital-Cornell University Medical Center, New York, Drs. Edward H.

Robitzek and Irving J. Selikoff, Seaview Hospital, New York, together with Hoffmann-La Roche Research Laboratories, Nutley, N. J., and The Squibb Institute for Medical Research, New Brunswick, N. J., for "contributions of the first order to our knowledge of the principles of the treatment and control of tuberculosis" with the isoniazid drugs.

Science News Letter, November 5, 1955

## ELECTRONICS

**"Brain" Watches Flow Of Niagara Falls**

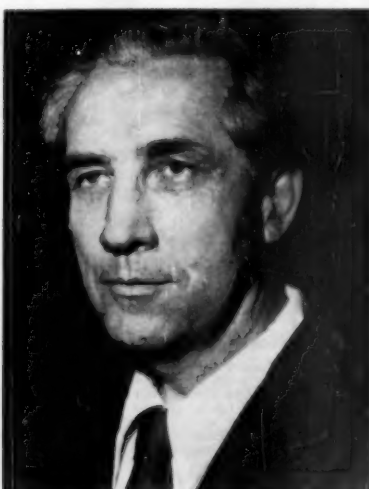
▶ AN ELECTRONIC "BRAIN" is keeping tabs on Niagara Falls.

The computer has already analyzed 26,000 observations on the hourly flow in the Niagara River. The result has been more accurate forecasting of the variations in the river's flow, L. J. Lacey and P. L. Dandeno told a meeting of the American Institute of Electrical Engineers in Chicago.

With better understanding of the river's eccentricities, the two engineers of the Hydro Electric Power Commission of Ontario said, the fullest amount of water can be used without risk of violating the Niagara Diversion Treaty.

This pact specifies that no diversion of water for electric power shall be made that will reduce the flow over the falls to less than 100,000 cubic feet per second during the tourist season or to less than 50,000 cubic feet per second at other times.

Science News Letter, November 5, 1955



**LASKER AWARDEES**—Dr. Robert D. Defries, left, director of the Connaught Medical Research Laboratories at the University of Toronto, and Dr. Karl Paul Link, right, professor of biochemistry at the University of Wisconsin, were named the two individual award winners of the 1955 Albert and Mary Lasker Awards. Four other awards went to groups.

## ANTHROPOLOGY

## Now Find First American Lived 30,000 Years Ago

► GRADUALLY scientists are pushing back the horizon when men first lived in America.

A new radiocarbon dating method with greater precision points to a date 25,000 to 30,000 years ago when men lived in a cave in the Sandia Mountains near Albuquerque, N. M. Previous, less precise methods had yielded a 17,000 to 20,000-year-old date.

The dating was not done on remains of man himself but on fragments of the tusk of a prehistoric elephant found in the same layer with remains of human habitation.

Apparently, reasons Dr. Frank C. Hibben of the University of New Mexico, in reporting the new evidence in *Science* (Oct. 14), the Sandia hunter carried back to the cave large sections of the body of the huge animals. The meat was cut from the bones, as is indicated by scars on the bone surfaces.

At least occasionally, the hunters brought in portions of the head and skulls, presumably to eat the brain as a delicacy at their feasts and to make use of the ivory tusks in their tools and weapons.

Hence, if the tusks were 25,000 to 30,000 years old, so also was the hunter.

The dating by the new technique was accomplished at the Harrison M. Randall Laboratory of Physics, University of Michigan, by Dr. H. R. Crane, and reported by him in the same issue of *Science*. It involves converting the organic material of the tusk to a carbon dioxide gas and introducing the gas into a Geiger counter.

It requires a sample very much smaller than that required by the earlier method that employs a solid carbon sample. Advantage of the new method is that it is possible to use only the organic constituents of the tusk, barring extraneous carbon.

One possibility, which is, however, most unlikely is that the ancient men who lived in Sandia Cave included in their number some ancient archaeologists who collected

and brought home tusks belonging to earlier times. This remote possibility will be checked by further dating work.

Science News Letter, November 5, 1955

### BUILD YOUR OWN NEWTONIAN TELESCOPE

It's easy to assemble a complete professional reflector unit in less than an hour with this new telescope kit. Directions are simple and clear. All parts and optics are precision engineered to the highest standards of accuracy. You'll get observatory results! Send 10¢ for exciting new catalog.

OPTICAL ENGINEERING CO., Dept. 5N,  
164-19 Northern Blvd., Flushing 58, N.Y.

### LINGUAPHONE

MAKES IT EASY TO LISTEN AND LEARN to

Speak

SPANISH • FRENCH • ITALIAN  
GERMAN • RUSSIAN • JAPANESE  
MODERN GREEK—34 languages available

#### For 10-DAY FREE TRIAL

Only LINGUAPHONE, the World's Standard Conversational Method, brings the world's best native language teachers into your home. For just 20 Minutes a Day you listen to Linguaphone's MODERN Recordings. They make it easy—AND FUN—to learn another language AT HOME—the same natural way you learned to speak English long before you went to school.

You Listen. You Understand. You SPEAK. It's like living in a foreign land. You hear 8 to 12 native men and women converse about everyday matters. You acquire a true accent no TEXTBOOK CAN TEACH.

Existing Business, Travel Opportunities Here And Abroad. The Linguaphone Method is used round the world by schools, colleges, governments, large business firms. Over 1,000,000 home study students.

Stop Wishing—Start Talking! SEND FOR FREE BOOK and details of FREE TRIAL. Linguaphone Institute, TR-31-115 Radio City, N. Y. 20, N. Y.



### A Key to Precious Stones

By L. J. SPENCER

Formerly Keeper of  
Minerals, British Museum

"The author has set a high standard for popular works on scientific subjects. By avoiding technical treatment and using simple language he introduces the reader to the fundamentals of the subject. Well-worn facts are given new lustre and recent discoveries are presented in a manner that is intelligible to the layman. Within the compass of a small, inexpensive book, provided with a good index, is collected considerable information formerly scattered through a voluminous literature, including much that is new to the advanced student."—*Mineralogical Magazine*.

A Book of Permanent Value

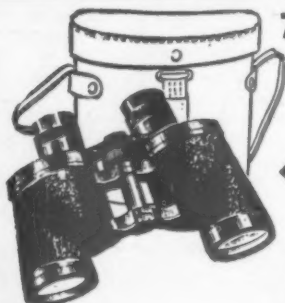
MANY ILLUSTRATIONS—\$3.50 Postfree

5-Day Money-Back Guarantee

EMERSON BOOKS, Inc.

Dept. 619-K, 251 W. 19th St., New York 11

## SAVE! BUY DIRECT FROM THE IMPORTER!



### 7x, 35 Light Weight Binoculars

Ultra-powerful, yet compact—only 5 inches high and 50 light! Genuine Kiaroptar coated lenses. Synchronized center focusing. Weighs only  $\frac{1}{2}$  of regular 7x binoculars. Prismatic lens system gives needle-sharp definition. Slips easily into coat pocket. We've sold hundreds at much higher prices. Order by No. 170, Special to readers of this magazine, including tax and pigskin case, only

**\$34.95**

FTI

### 7x, 50 mm 3-D Binoculars

Same high quality as our 7x 35's. Has all above features, including CENTER focusing. Handsome pigskin case. Needle-sharp viewing even at night. Our very BEST value. No. 147, tax paid

**\$29.50**



**745**

### 20 Power Precision Telescope

**SPECIAL!** . . . Lowest price ever! Brings most distant objects in clear, sharp detail! See up to 37  $\frac{1}{2}$  miles away! 3 times stronger than binoculars used by army! Handsome—all metal design. **WEIGHS ONLY 9 OZ.**—only 6  $\frac{1}{2}$  inches clod! Ideal for celestial observations on trips! **\$7.45**

No. 195, only

Send cash, check or m.o. for prompt free delivery. (C.D.'s plus postage). Order by number—5 day trial money back guarantee. Order from famous:



### 3 TURRET MICROSCOPE 100x 200x 300x

Imagine! . . . **TRIPLE** revolving turrets . . . 300, 200 or 100 power focusing! Finely ground, polished Achromatic lenses. . . **ALL METAL** construction . . . Precision-tooled threadings. Ideal for lab, school or hobby use. Sturdy wooden case and dust-proof plastic cover included. Latest, most attractive design. Extra sturdy & durable for roughest handling. This low, low price of \$9.44 may never be repeated again.

No. 198 . . . **\$9.44**

FTI

THORESEN'S, Dept. 79-M, 352 Fourth Ave., New York 10, N. Y.

## MEDICINE

# To Help Drowning Tots

**New artificial respiration method is devised especially for infants of the drooling age. Will work for falls into the fish pond or smothering under a pillow.**

► LIVES of many babies and toddlers can be saved by a new way of giving artificial respiration designed especially for them.

Their small size and normally drooling and dribbling state require a method different from those used for older children and grown-ups, declares the inventor of the new method, Capt. H. J. Rickard, U. S. Naval Air Missile Test Center, Point Mugu, Calif.

Whether the danger is from nerve gas poisoning, smothering under a pillow or falling into an unguarded swimming pool or fish pond, more of the under-two-year-olds can be saved if grown-ups know and quickly use the right kind of artificial respiration.

Capt. Rickard's method is called the Rickard prone tilting-visceral shift method. He reports it in the *Journal of the American Medical Association* (Oct. 22).

In this method the small child or baby is laid face down on the outstretched right forearm with the head in the operator's hand and the legs straddling the elbow joint. The operator's right middle (not index) finger is held in the child's mouth to keep the tongue down and the mouth open so there is a free airway to the lung. The rest of the right hand supports the child's head, and the left hand on top of

the child's neck and shoulders helps hold it.

The operator's arm with the child on it is moved up and down in see-saw fashion at a 45-degree angle each way. This makes the abdominal organs push and pull on the diaphragm, forcing air in and out of the lungs.

The rate of tilting is between eight and 12 times a minute. The operator keeps the rhythm by repeating "Out goes the bad air, in comes the good air," for a complete cycle of 12 times a minute.

He starts with the downward tilt as he says the word "Out." Then as he says "In" he tilts upward.

While the method follows the principle of other ways of giving artificial respiration, it saves small children from the danger of broken ribs and punctured lung tissue which have come when these other methods were used. The reason for such accidents is the difference between the weight of the grown-up operator's body and that of the small child.

The method was devised for children from one week to two years old with weights ranging from seven to 28 pounds. The procedure is simple, requires no great effort or strength and is easily learned.

Science News Letter, November 5, 1955

## MEDICINE

# Two-Way Heart Surgery

► A TWO-WAY surgical attack on heart disease in some patients is pictured for the future in a report to the American Heart Association meeting in New Orleans.

The attack would be by a nerve-cutting operation and another operation designed to add new blood vessels to supply the heart.

The report was from Drs. Sidney Scherlis and R. Adams Cowley of Baltimore.

One part of the two-way attack has already been made successfully on a few patients. This consisted in opening the left side of the chest and cutting all branches of the left vagus nerve going toward the heart.

The patients had all been seriously incapacitated for an extended period of time by severe recurrent pain. They had the heart disease known as angina pectoris.

Of the first six patients operated on, one died immediately after the operation.

"The other five were significantly benefited in varying degrees, as measured mainly in terms of increased ability to exercise without discomfort," it was reported.

The operation was planned because the doctors think that more factors than hardening or narrowing of the arteries alone play a part in both angina pectoris and in coronary thrombosis.

One of these factors, they theorized, might be the influence of the nervous system. Stimulating certain nerve branches to the heart in laboratory animals produced striking and consistent electrocardiographic changes. The changes strongly resembled those that come with acute heart attacks in humans.

Cutting the nerves, according to the theory, should stop nervous impulses from reaching and damaging the heart. The success of the operation so far seems to bear out the theory.

"It may be," the doctors stated, "that the eventual approach in patients severely incapacitated by angina may be twofold, selective vagotomy (the nerve-cutting) to remove possible vasoconstrictor influences and a revascularization procedure to add new vessels."

Science News Letter, November 5, 1955

## SURGERY

# Can Transplant Teeth In Selected Patients

► SUCCESS in transplanting a tooth from one part of a patient's mouth to another was announced by Dr. Chester C. Fong of Hayward, Calif., and Dr. R. Gordon Agnew of San Francisco at the meeting of the American Dental Association in San Francisco.

The case they reported was a 16-year-old girl who had lost one of her lower first molars because of a deep chronic abscess. The first molars, which erupt when a child is about six years old, are called the key-stone of the dental arch because of their importance to the alignment of the rest of the permanent teeth.

The 16-year-old girl had a developing lower wisdom tooth transplanted to the socket left empty when the first molar was extracted.

At the end of five years, the transferred tooth was full size, the roots had lengthened and it was in harmony with the adjoining tooth and the opposing upper molar. The response of the tooth to heat and cold was similar to that of other teeth.

The dental scientists emphasized that the transplantation technique is successful only in certain carefully selected cases. One basic fact is that the tooth to be transplanted must be in a suitable stage of development for the procedure, they said.

Science News Letter, November 5, 1955

## MEDICINE

# Damaged Hearts Have Strength for Come-Back

► HEARTS have the reserve strength for a good come-back even when there has been extensive damage by loss of blood to the heart muscle.

Exercise tests showing this were reported by Dr. Thomas N. P. Johns and Byron J. Olson of the National Institutes of Health, Bethesda, Md., at the meeting of the American Heart Association in New Orleans.

They induced in experimental animals heart attacks similar to the one suffered by President Eisenhower. The condition similar to a coronary occlusion or coronary thrombosis was produced in the animals by tying off a main coronary artery with surgical silk.

The animals used for the experiments were laboratory rats.

Exercise during the first six hours following coronary occlusion produced a significantly higher mortality in the experimental rats, the scientists found. But after this "shock period" had passed, there was "no significant difference in exercise tolerance" between the rats with damaged hearts and the rats in a control group whose chests were opened but whose arteries were not tied off.

These results are seen as showing the extensive reserve strength of the heart.

Science News Letter, November 5, 1955



## ASTRONOMY

**More Accuracy Foreseen In Measuring Starlight**

► **COMPLETION** OF a spectrograph designed specifically for use with a photoelectric cell may mark the beginning of a period of greater accuracy in measuring radiation from stars.

The photoelectric spectrograph was developed by Profs. A. D. Code and A. E. Whitford of the University of Wisconsin astronomy department. The device was perfected in connection with a program of research at the University of Wisconsin in which photoelectric cells have replaced photographic plates in measuring stellar energy.

Unlike the photographic plate, the photoelectric cell will respond directly to the intensity of light. This means that, while photographic plates will only show the brightness of stars relative to each other, photoelectric cells can indicate absolute brightness by showing the amount of energy produced at any given wavelength of light by any observable star.

The greater accuracy of the new technique is expected to enable astronomers to specify more exactly the structure and chemical composition of stars and to accumulate more information on inter-stellar matter.

Science News Letter, November 5, 1955

## CARDIOLOGY

**Find Radioactive Way To Study Heart's Activity**

► **A NEW RADIOACTIVE TECHNIQUE** for determining the heart muscle's chemical activity has been developed by Dr. Walter S. Wilde and associates of Tulane University, New Orleans.

Relations between chemical activity and heart disease such as coronary thrombosis may eventually be studied through this new technique. With its aid, also, Dr. Wilde hopes much more can be learned about effects of various drugs on the heart.

The heart muscle can be compared to an electric battery, Dr. Wilde said in explaining the new technique at the meeting of the American Heart Association in New Orleans. Scientists have long known that the contracting heart muscle produces electrical charges. Study of these charges through the electrocardiograph gives doctors information about heart conditions.

Electric batteries produce electricity through movements of charged particles, resulting from the action of acid on metal. Electric charges in the heart, it is believed, result from similar activity.

Drugs like digitalis which influence the heart make the particles move. This acts to strengthen or weaken the heart beat, depending on the drug used.

The technique uses radioactive potassium to study the motion of the chemical particles in the heart as it beats, or contracts. So far it has been used only on animal hearts

such as the turtle's. The animal heart is removed from the body and injected with radioactive potassium. Then it is rigged to a pipeline supplying a constant stream of salt solution to allow it to beat normally.

As it beats, minute particles of the radioactive potassium are released from the heart muscle. These released particles, being radioactive, can be counted. A special apparatus called the effluograph is used to measure the particles. It is so exact that as many as 17 samples per second and per beat may be separated for counting.

The findings on the release of the radioactive potassium particles are being correlated with the information from electrocardiogram readings in order to gain an understanding of the inter-relations of chemicals and electricity in the heart muscle.

Science News Letter, November 5, 1955

## AGRICULTURE

**Chemical Halts Sprouting Of Stored Potatoes**

► **A CHEMICAL** that stops sprouting of stored potatoes and cuts down rotting has been discovered by researchers of the U.S. Department of Agriculture.

Testing with 3-Cl-IPC, 3-chloro-isopropyl-N-phenyl carbamate, the scientists found that the material was a good inhibitor of potato sprouts at temperatures ranging from 45 to 65 degrees Fahrenheit.

At 45 to 55 degrees Fahrenheit, the chemical prevented sprout development for eight months and, at the same time, reduced rotting in the stored potatoes.

The chemical showed little effect on potatoes stored at 70 degrees and above, however.

The USDA cautioned that the chemical still needs to be tested for possible effects on quality of the potatoes and hazards to consumers before it can be recommended for general use.

Science News Letter, November 5, 1955

## ELECTRONICS

**Ultrasonic Torpedo Seeks Out Target**

► **AN AUTOMATIC "seek-and-kill"** system for submarine torpedoes that uses transistors instead of conventional vacuum tubes has been developed, the Navy has announced.

The new guided torpedo system eliminates the need for a 30-second warm-up period before firing. It uses less current and is more compact.

Transistors, which have steadily been taking over the function of vacuum tubes in devices where current and space are limited, are rugged pea-sized gadgets that use semi-conductive germanium crystals.

Developed by Westinghouse Research Laboratories, the torpedo guides itself toward the enemy target with ultrasonic sound waves in the water much like today's modern airborne guided missiles use radar.

Science News Letter, November 5, 1955

**IN SCIEN**

## HERPETOLOGY

**World's Largest Garter Snake Found in Arizona**

► **THE WORLD'S LARGEST** known garter snake—a three and one-half footer—has been reported by a zoologist at the University of California at Los Angeles.

The yard-long reptile was picked up by James Vial beside an irrigation ditch near Yuma, Ariz. It apparently had thrived on the toads and frogs along the ditch. It is of a common variety of snake known as Marcy's garter snake, and is 14 inches longer than the longest garter snake on record. Other than its large proportions, the reptile is identical with the small, striped variety that little boys carried around in their pockets to scare little girls and just as harmless, according to Mr. Vial.

The U.C.L.A. zoologist said that, after a few weeks of observation, the snake will be pickled for posterity and placed in the University's bottled reptile collection.

Science News Letter, November 5, 1955

## HERPETOLOGY

**Tortoise Shell Dates May Not Be So Old**

► **PICK SOMETHING** more durable than a tortoise's shell to carve your initials for posterity.

This is the advice of Dr. Loye Holmes Miller, professor emeritus of biology at the University of California at Los Angeles who has been observing desert tortoises for years.

He takes with a grain of salt the old tales about tortoises that have survived in the wild for a century or so as evidenced by initials and dates carved on their shells.

He has found that such carvings disappear within a year or two due to shell regeneration in the animal.

Other items of interest about desert tortoises gleaned from Dr. Miller's studies are:

1. Bladder stones are apparently common among them, but probably do not generally have serious effect on the animals.

2. Male tortoises begin to achieve maturity at about the same age as human males, that is from about 16 to 20 years of age.

3. Egg laying is a big event in female tortoises' lives. They will not eat or drink for some time preceding the event.

4. Females may lay eggs twice a year, and up to 14 eggs at one sitting. Fertile eggs have been laid up to one and one-half years after possible contact with a male.

Science News Letter, November 5, 1955



# THE FIELDS

## PSYCHOLOGY

### Baby Monkeys Smarter Than Scientists Suspect

► **BABY MONKEYS** are a lot smarter than scientists have suspected.

Experiments conducted by Drs. Harry F. Harlow and William A. Mason of the University of Wisconsin primate laboratory show that by the age of 90 days a rhesus monkey can succeed in tests formerly applied only to adult monkeys.

Each monkey used was permanently separated from its mother within ten hours after its birth. It was then subjected to a series of tests in learning ability. The tests grew more difficult as the animals matured.

The experiments show that at the age of five days a monkey can be conditioned to respond to a simple stimulus, in this case, to a tone associated with an electric shock.

By the time a monkey is 40 days old it can learn a simple maze.

At the age of 90 days monkeys can be submitted to adult-level tests involving selection of objects with food as the reward. The scientists have found that the three-month-old animals can perform the tests with almost—but not quite—the proficiency of a fully matured three-year-old monkey.

The investigators expect research with baby monkeys will reveal much about learning in the primate family, including, perhaps, in man.

Science News Letter, November 5, 1955

## AGRICULTURE

### New Insecticide Fights Apple Foes, Aids Friends

► A "NATURAL" INSECTICIDE that controls insect pests while leaving helpful insects relatively unharmed has been found by U. S. Department of Agriculture scientists.

Experiments in an apple orchard near Kearneysville, W. Va., showed that the insecticide, called ryania for the tropical shrub it comes from (*Ryania speciosa*), should prove profitable to apple growers in the East. According to the USDA, ryania shows these advantages:

1. It is selective between harmful and helpful insects.

2. It controls the destructive codling moth, and might prove an excellent reserve defense against DDT-resistant strains.

3. It does not injure plant tissues, it is comparatively safe for man and animals, and it is one of the few insecticides exempt from residue tolerance limitations on crops.

Apple growers have a natural ally in certain mites which feed on harmful species. These beneficial mites succumb quickly to standard insecticides. Ryania, however, has

attacked the harmful mites, while allowing the predators to increase in number. In one test plot, the beneficial mites actually outnumbered the harmful ones after ryania treatment.

To test ryania's effectiveness against the codling moth, 3,741 apples from a treated area were checked. Only one codling moth entry was found in the entire lot.

Science News Letter, November 5, 1955

## TECHNOLOGY

### Australian Airplanes Catch Falling Missiles

► **PILOTS** at Australia's Woomera Weapons Research Establishment are being trained to fly planes that catch falling parachute-borne rocket missiles in midair.

The new method means that missiles can be recovered intact before being damaged in bumpy parachute landings.

When the rocket begins to fall, a parachute opens. A plane flies at a lower level with a 500-foot paravane, trailing slightly to one side.

The plane then flies alongside the falling missile, and grapnels on the paravane cable grip on a cable trailing from the parachute.

The "catch" is played like a fish on the line and the plane flies down a gully spanned by cables, so that the rocket is transferred from the paravane to a cable across the gully, where it swings until collected.

The new missile-catching method was invented by H. G. Pritchard, a former chief superintendent at Woomera.

Science News Letter, November 5, 1955

## CHEMISTRY

### Fuels, Plastics, Dyes, From Nitroparaffins

► **NITROMETHANE**, a liquid used in the motors of model engines, was suggested as fuel for high flying aircraft at the symposium on nitroparaffins in New York. The meeting marked the 20th anniversary of an industrial research project carried out jointly by Purdue University and the Commercial Solvents Corporation.

Nitromethane is a compound of nitric acid with the simplest chemical in a series of hydrocarbon compounds derived from petroleum. The product is related to, but less dangerous than, the explosive chemicals used in war. Adding the nitro chemical group to paraffin oils introduces oxygen into the molecule, which allows the fuel to burn at high altitudes where there is less oxygen in the atmosphere to support combustion.

Heavier and more complex members of the chemical series begun by nitromethane have found uses in the composition of dyes and plastics, the research chemists reported. Waxes and new kinds of synthetic rubbers are other products in which the new nitrogen-containing materials will find use, the chemists stated.

Science News Letter, November 5, 1955

## MEDICINE

### Blood Cells Forecast Likely Cancer Outcome

► **THE ARRANGEMENT** and number of blood cells and certain other body cells gives a forecast of the probable outcome of breast cancer, Drs. F. D. Speer and M. M. Black of New York Medical College, New York, reported at the meeting of the American Society of Clinical Pathologists in Chicago.

Examination under the microscope of slices of breast cancers and their associated lymph glands led the New York pathologists to develop their grading system for the chances of the patient's survival.

They said, in effect, that the body's reaction to the disease may be measured by the amount of blood cells that attempt to surround the cancer and the growth of certain other cells within the lymph glands associated with the cancer.

A longer survival time may be anticipated for the patient if there is a marked tissue reaction by lots of histiocytes and lots of lymphocytes. Histiocytes are scavenger cells which remove diseased or dead cells and lymphocytes are their second cousins.

Science News Letter, November 5, 1955

## DENTISTRY

### Hog Pancreas Powder For Teeth and Gums

► A **TOOTH POWDER** made from hog and cattle pancreas makes gums healthier and helps keep teeth free from excessive tartar deposits and stains.

The powder was announced by Dr. Arthur L. Jensen of the University of California College of Dentistry, Berkeley, at the meeting of the American Dental Association in San Francisco.

Tests of the powder were made on 232 persons who were prone to serious gum disorders. All had been visiting the dentist two or three times a year for from two to 25 years.

All the patients showed some improvement and more than half showed substantial improvement in general gum health and ease of keeping the mouth clean after a one- to two-year trial of the new powder.

In spite of these promising results, he stressed that the investigation was "extremely restricted" and that more intensive investigation is needed to evaluate the powder.

Patients used it in addition to other oral hygiene measures at home, including regular toothbrushing. Once a day a small amount of the new powder was put on the teeth and gums with a toothbrush. It was left on for 15 to 20 minutes. Then with the same brush the powder was removed.

Dr. Jensen explained that the preparation, derived from the pancreas gland of hogs and cattle, is processed in the raw state into a powder and takes its presumed effect from so-called proteolytic enzymes in the powder.

Science News Letter, November 5, 1955

## WILDLIFE

# In Search of the Sun

Winter migration to the southland is not restricted to birds and rich humans. Animals from bats to whales travel thousands of miles with change of season.

By HORACE LOFTIN

► THE DAYS are turning shorter and snow has already fallen in some sections of the country. With winter thus closing in fast, migratory birds—and all human beings who can afford it—have started or are starting their annual flight southward ho!

While birds and men are the best known migrants, they are far from alone in their seasonal pursuit of the sun. A host of higher animals, ranging from the pint-sized bats to gargantuan whales are as keen for travel, and some of them may wander for thousands of miles in response to the changing of the seasons.

Three of the American species of bats use their wings to search for warmer weather, although the majority spend the winter deep in caverns or other well-protected hollows, where the temperature is at all times above the freezing point.

The stay-at-home bats pass the winter in restless sleep—not quite a true hibernation—and may even be seen flying about on warm winter days. In autumn, these bats from many miles congregate at a choice cavern, and in a sense this is a minor migration.

But the red bat, larger hoary bat and the silver-haired bat are true long-distance seasonal wanderers. Differing from the other American bats, they seem to have an aversion to entering caverns and prefer to spend their days hanging among leaves or snuggled under loose bark.

When winter approaches, these tree-dwelling species take to their wings for southward flights that carry them hundreds of miles.

## Bats in the Atlantic

Their wanderings have led these bats to strange places, too. All three species are occasional visitors to the Bermuda Islands, far in the Atlantic Ocean. Once a red bat was found hanging beneath the stall of a giraffe—several hundred miles at sea. It seems that a shipment of wild animals for the Philadelphia zoo was approaching the coast, three days out of port, providing this unusual resting spot for this migrating, sea-going bat.

There are races of both hoary and red bats on the Hawaiian Islands, the only bats there. To scientists, this suggests that these two types alone have had the wing stamina to reach the islands, a flight of 2,500 or more miles over the open Pacific Ocean.

The three species of migrating bats' southward flight seems to be carried out in leisurely style, from mid-August into November, with peak migration in early September. They fly in small, straggling groups. All three species may mingle in the same flight, but each migrating group is usually made up of bats of the same sex.

When air travel is not available, a long sea voyage south seems to be the next preferred winter trip. Whales and seals both are great ocean travelers, swimming thousands of miles at migration time.

The females and young of the Pribilof Island fur seals, which spend their summers far north in the Bering Sea, winter over as far south as southern California. As the weather warms in spring, the females plow a straight course through 3,000 or more miles of ocean from their southern winter range to the far-off breeding grounds of the Pribilofs.

## Whale Away

The old bull seals pass the winter south of the Aleutian Islands or in the Gulf of Alaska. They arrive at the Pribilofs ahead of the females in the spring, fighting each other ferociously for possession of choice breeding spots. A single bull may have as many as 40 cows in his harem, and woe betide the unattached male that tries to crash into his domain.

The cows deliver their pups in a matter of hours or days after they reach the rookeries. Mating occurs shortly afterward, and the cows take to the sea again to feed. They return to the rookeries at about two-day intervals to nurse the pups.

During the entire breeding season, the bulls do not leave their stations on the rookeries, doing without food for three months. In early August the bulls slip back to the sea, and by November the cows and their pups begin the long migration to the winter quarters.

While severity of climate is a large factor in animal migration, often it is the search for a better food supply that leads to the wanderings. The lengthy seasonal travels of the whalebone whales, which harvest the ocean for tiny bits of marine life (plankton), show how migration is closely tied to food supply.

With the great coats of blubber, they are hardly affected by the ocean's temperature—but their source of food is. During the summer months, the waters near the north and south poles are extremely rich in the planktonic life on which the whales feed,

much more so than in warmer waters. So the great whales move into the polar seas.

But with the return of colder months, the plankton bloom falls off, and the titans drift towards the tropics for enough food to sustain their enormous bulk. Whales cover many thousands of miles in these seasonal movements.

The migrations of the great herds of American buffalo seemed to have been mainly a means to escape the climate. They traveled in a great circle, moving southward 200 to 400 miles to avoid the worst of the cold weather. The circle was closed as they made the return journey north with the first mild days of early spring placing them on a cooler range during the searing summer months.

Caribou, elk and mule deer also number among the larger migrating mammals.

Near Great Slave Lake, Canada, caribou are present into December, when they begin a great counter-clockwise migration. Passing the same spot at about two- or three-week intervals, their numbers steadily increase. In March, they form a wedge-shaped body and start a trek northwest. At first, the herd is predominantly made up of bulls, but by the time the march is over, cows and yearlings become the majority as the old bulls wander off.

This migration is often a race against mosquitoes, which make life almost unendurable in their lower range during the summer months. With the coming of fierce gales in July, which sweep the area clear of mosquitoes, the caribou herds begin the southward movement again.

## Some Leave for Good

The migration of elk has been closely studied in the Yellowstone National Park. In September and October, the elk straggle down from the high mountain areas in small bands, to pass the winter in the snow-free valleys. In spring, their return trip is along the same route, often in enormous herds which are stretched out in single file. When harsh conditions demand it, mule deer, too, make a migration into the lower valleys in search of winter food.

All mass movement of animals cannot be classed as migration, for this implies a return to the area with the changing seasons. Many animals do evacuate their old homes in enormous numbers, but with no intent to return.

The most dramatic example of this "emigration" is the case of the lemming of the Norwegian mountains. Reproducing at a startling rate, their home region soon cannot support their numbers. This overpopulation triggers a great exodus westward, ending for many only when they perish as they strike out blindly into the ocean.

## VETERINARY MEDICINE

## Experts Fret as Virus Loses Power to Kill

► THE GERM WARFARE British and Australian scientists have been waging against over-populating rabbits appears to be losing its punch.

A virus disease of rabbits, myxomatosis was introduced in Great Britain and in Australia in an effort to control the ravaging number of wild rabbits. At its peak, the insect-carried disease wipes out 99% of a rabbit population.

Now, however, there is a report that weakened strains of the virus are appearing in Great Britain and that infected rabbits are recovering. A study by Drs. J. R. Hudson, Harry V. Thompson and W. Mansi of the Ministry of Agriculture, Fisheries and Food in London shows that rabbits in fabled Sherwood Forest are recovering, though their cousins just a few miles south are succumbing to the germ warfare.

Alarm is also expressed by two microbiologists, Drs. Frank Fenner and I. D. Marshall from the John Curtin School of Medical Research in Canberra, Australia.

They state that it is now uncommon to find strains of the rabbit-killing virus having the same potency as the original strain brought into Australia to rid it of the wild rabbit problem. Similar Australian tests of the virus found in France show evidence of weakening too, they report.

Drs. Fenner and Marshall point out that experiments indicate that the less virulent strains will rapidly replace the stronger virus types wherever direct competition between them occurs.

Science News Letter, November 5, 1955

## How to Advance Yourself by "Firing" People

THE RE are two ways that you, as a business executive, can "fire" the people in your organization who are not doing too well.

One way is to discharge them for their weaknesses—even though you may really be underestimating their strengths. That means breaking in new people, who often turn out to be no better.

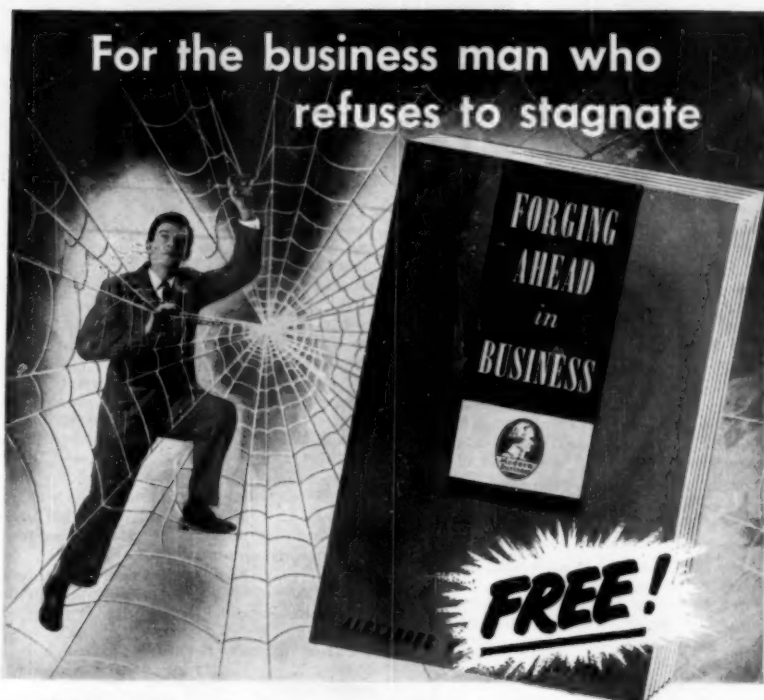
The other way to "fire" people is to use four tested management techniques that will *kindle* them with new interest in their work, and help them to develop their potentials to the full. That is the *constructive* way—for them and for you. It adds to your effectiveness as an executive, and actually *multiples* your own abilities—*starting right away*.

*Four Keys to Able Management* tells you in practical fashion how to go about advancing yourself by "firing" all your people. This 32-page Executive Development brochure will cost you only one dollar. It may prove the most profitable dollar you ever spent. The vice-president of a large company wrote us: "Nothing else you have published exceeds this brochure in practical utility to the executive. I wish I had had the benefit of this thinking many years ago."

Just clip out this ad, attach it to your letterhead or a sheet of paper with your name and address, and enclose \$1. Your copy of *Four Keys to Able Management* will be mailed promptly.

THE UPDEGRAFF PRESS, LTD.  
424 Harwood Building, Scarsdale, N. Y.

## For the business man who refuses to stagnate



HALF the world is half asleep! Men who could be making twice their present salaries are coasting along, hoping for promotions but doing nothing to bring themselves forcefully to the attention of management.

They're *wasting* the most fruitful years of their business lives . . . throwing away thousands of dollars they may never be able to make up. And, oddly enough, they don't realize—even remotely—the tragic consequences of their failure to forge ahead while time is still on their side.

These are the men who are unknowingly headed for the frustrations and the disappointments of mediocrity. They'll go part way up the ladder and down again by the time they're fifty years old. They'll be executive material in their twenties and thirties—and clerks in their fifties. They'll have high hopes for themselves and their families while they're young; but only struggling, skimping and regret later on when their earning power should be at its height.

## Send for Your Free Copy of "Forging Ahead in Business"

If you want to discover how to succeed while you are still young—if you want to avoid the heartbreak of failure in later years—send today for "Forging Ahead in Business" . . . one of the most practical and realistic booklets ever written on the problems of personal advancement.

Here you will find—not a "pep talk," not an academic lecture—but cold, hard facts on how to improve your position and increase your income. You will be told what the qualifications of an executive are in today's competitive market . . . what you must *know* to make \$15,000, \$20,000 or more a year . . . what you must *do* to accumulate this knowledge.

"Forging Ahead in Business" was written for mature, ambitious men who seriously want to get down to bed-rock in their thinking about their business future. If you feel it is meant for you, simply fill in and return the coupon below. Your complimentary copy will be mailed to you promptly.



ALEXANDER HAMILTON INSTITUTE  
Dept. 392, 71 W. 23rd Street, New York 10, N. Y.  
In Canada: 57 Bloor St., W., Toronto, Ontario, Canada

Please Mail Me, Without Cost, a Copy of Your 48-Page Book—  
"FORGING AHEAD IN BUSINESS"

Name

Firm Name

Business Address

Position

Home Address



# Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N. Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

**ACADEMIC FREEDOM IN OUR TIME**—Robert M. MacIver—*Columbia University Press*, 329 p., \$4.00. Intended to show the need for a stouter defense and wider understanding of the intrinsic values of higher education.

**ASTROPHYSICAL QUANTITIES**—C. W. Allen—*University of London, (John de Graff)*, 263 p., \$10.00. Presenting essential quantitative information of astrophysics in a form that can be readily used.

**A COURSE IN MODERN TECHNIQUES OF ORGANIC CHEMISTRY**—R. P. Linstead, J. A. Elvidge and Margaret Whalley — *Butterworth (Academic)*, 190 p., illus., \$5.00. Based on a course introduced in 1951 at the Imperial College of Science and Technology in England.

**DIVING FOR SCIENCE**—Lynn Poole—*Whittlesey House*, 160 p., illus. with drawings by Jeanne Bendick, \$2.75. Telling about undersea exploration for fun and for research.

**HAMMOND'S AMBASSADOR WORLD ATLAS**—*Hammond*, 2d. rev. ed., 416 p., illus., 326 maps, \$12.50. Changes in boundaries and political control kept the editors busy between publication of the first edition and this one.

**KEEN TEENS: OF 101 Ways To Make Money**—Stookie Allen—*Emerson*, 128 p., illus., \$2.50. Among the activities suggested is that of study-

ing science and qualifying for one of the Science Talent Search awards.

**THE MAGIC OF WATER**—G. Warren Schloot, Jr.—*Scribner's*, 46 p., illus., \$2.50. Photographs are used to illustrate some elementary facts about how water changes state from liquid to ice or to vapor, and how it can be used to do work.

**OLD AGE IN THE MODERN WORLD: Report of the Third Congress of the International Association of Gerontology, London—C. A. Boucher and others, Ed. Committee—*Livingstone (Williams & Wilkins)*, 647 p., illus., \$8.00. Various attempts to meet a social problem that is becoming more urgent as medical science increases length of life.**

**THEORETICAL GENETICS**—Richard B. Goldschmidt—*University of California Press*, 563 p., illus., \$8.50. Selecting salient facts and ideas and presenting them as the author sees their meaning for a general theory of genetics.

**WHAT GOOD NURSING MEANS TO YOU**—Susie Berg Waldman—*Public Affairs Committee, Public Affairs Pamphlet No. 60A*, 28 p., illus., paper, 25 cents. Giving an understanding of the problems facing the nursing profession in its attempt to give increasing numbers of patients needed care.

Science News Letter, November 5, 1955

## CARDIOLOGY

### Seeing Yellow Cautions Heart Drug Overdose

► A NEW MEDICINE that makes patients see yellow was reported at the meeting of the American Heart Association in New Orleans.

The medicine is called acetyl-digitoxin. It is a special preparation of the standard heart medicine, digitalis.

The seeing-yellow symptom that comes with acetyl-digitoxin is a warning signal that the patient has had too much of the medicine.

Digitalis and its various preparations are given to improve the tone of the heart muscle and make it better able, after a heart attack, to carry the load in spite of some damage. Too much digitalis, how-

ever, is bad for the heart, making it beat in irregular rhythms.

With some digitalis preparations, the effects of too much digitalis do not cause symptoms the patient notices until after some damage has been done to the heart. With acetyl-digitoxin, these symptoms come early and send the patient back to his doctor right away. Then the doctor can modify the dose of the heart-toning medicine he administers.

Loss of appetite, nausea and vomiting are other early symptoms of too much digitalis.

The toxic effects from this new digitalis preparation are usually gotten over in one to three days.

Results of a trial of the medicine in 166 patients were reported by Drs. R. B. Crouch, M. R. Hejtmancik and George R. Herrmann of the University of Texas, Galveston.

Science News Letter, November 5, 1955

## ENGINEERS WANTED

Hundreds of openings for graduate engineers at all levels and in all sections of the country are listed in new monthly magazine. See it at your technical library, college placement bureau, or send 25¢ for copy. Address Engineers Placement Guide, Dept. C, 59 E. Van Buren Street, Chicago 5, Ill.

SEND FOR  
**Free Record**  
START SPEAKING  
**FRENCH**  
**SPANISH** ALMOST OVERNIGHT!  
HERE'S the easiest way to learn FRENCH, SPANISH, Russian, German, Italian, Japanese or Brazilian. Listen to FREE 3-sided non-breakable record. Let your eyes follow words in FREE sample lesson. Almost at once you'll be chatting in a new language with a perfect accent! That's all you hear! No memorizing needed. Just listen—imitate! It's that easy! Offer may end soon. Rush 25¢ to help cover cost of special packaging, shipping. State language you want. We'll also send free information on full Cortina course. No obligation. CORTINA ACADEMY, Dept. 6011, 136 W. 32nd St., New York 19.

## REFLECTIONS of a PHYSICIST

by P. W. BRIDGMAN

NEW ENLARGED EDITION

This collection comprises the bulk of the non-technical writings of Dr. Bridgman, including ten papers here added to the first edition of 1950. The topics range over a considerable field, but there is a certain unity in the treatment in that the "operational" approach is used throughout. It is this approach which has made possible the success of modern physics in meeting revolutionary new physical situations. The present collection may be regarded as an extension of the operational approach to problems in other fields than physics.

## CONTENTS

### I—General Points of View

Operational Analysis—Some General Principles of Operational Analysis—Science: Public or Private?—Freedom and the Individual—On Scientific Method—Some Implications of Recent Points of View in Physics—The Operational Aspect of Meaning—Science and Common Sense—The Present State of Operationalism

### II—Applications to Scientific Situations

The New Vision of Science—Permanent Elements in the Flux of Present-Day Physics—The Recent Change of Attitude toward the Law of Cause and Effect—Statistical Mechanics and the Second Law of Thermodynamics—The Time Scale—On the Nature and Limitations of Cosmical Inquiries—Einstein's Theories and the Operational Point of View—Impertinent Reflections of History of Science.

### III—Primarily Social

The Struggle for Intellectual Integrity—Society and the Intelligent Physicist—Science, and its Changing Social Environment—Scientist and Social Responsibility—Science and Freedom—Reflections of a Physicist—The Strategy of the Social Sciences—Science, Materialism and the Human Spirit—The Discovery of Science—The Task before Us.

### IV—Specific Situations

"Manifesto" by a Physicist—A Challenge to Physicists—Scientific Freedom and National Planning—Sentimental Democracy and the Forgotten Physicist.

### V—Prophetic

The Prospect for Intelligence—New Vistas for Intelligence.

Mail to your Bookseller or to  
PHILOSOPHICAL LIBRARY, Publishers  
15 East 40th Street, Desk 35,  
New York 16, N. Y.

Please send me \_\_\_\_\_ copies of "REFLECTIONS OF A PHYSICIST" @ \$6.00 each. I enclose remittance to expedite shipment and save mailing cost.

Name \_\_\_\_\_

Address \_\_\_\_\_



## AGRICULTURE

Human Disease Drugs  
Used for Sick Crops

➤ **ANTIBIOTICS**, which have scored so many victories against human disease, are now going to work against the diseases of man's agricultural crops.

Antibiotics have already been used under commercial conditions to fight formerly "incurable" plant diseases, Dr. W. J. Zaumeyer, plant pathologist with the U. S. Department of Agriculture, told the first International Conference on the Use of Antibiotics in Agriculture in Washington.

Diseases already controllable with antibiotics include fire blight of pears and apples, walnut blight, bacterial spot of tomatoes and peppers, potato seed piece decay, wilfire and blue mold of tobacco, halo blight of beans, and bacterial blight of celery, reported Dr. Zaumeyer.

Plant diseases cost the nation an estimated \$2,000,000,000 each year.

Antibiotics are economically feasible at present if used for crops requiring low dosages or plant diseases which can be controlled with low concentrations, Dr. Zaumeyer said.

The antibiotics may be either sprayed or dusted on plants, or used as a dip for seeds before planting. They are then absorbed by the plants and carried upward through the internal circulation of the plants. Sprays and dusts are both to prevent disease and to treat plants already infected, Dr. Zaumeyer said.

Scientists from 14 nations attended the conference.

Science News Letter, November 5, 1955

## NICE CAR

**W** IPE it off every nice day with a \$2 Kozak Auto Dry Wash Cloth and you will never have to hose it. KOZAK will even DRY wash a nice car that is so dirty you can hardly tell the color of the paint. Been doing it for 30 years now. For people whose cars are always clean.

This \$2 investment will return you fifty in car-wash savings. And has been so guaranteed to 10 million buyers since 1926.

The Original

**KOZAK**

Auto Dry Wash

© Kozak, 360 S. Lyon St., Batavia, N. Y.

Please send postpaid at once:

REG. \$2 KOZAKS  
(millions use them)

SUPER \$3 KOZAKS  
(lasts four times longer)

☐ 1 for \$2

☐ 1 for \$3

☐ SPECIAL INTRODUCTORY OFFER

2 Reg. (\$4) plus 1 Super (\$3)—\$7 value—\$5.00

Enclosed ☐ check ☐ cash

☐ Check here for free Xmas wraps.



EXCELLENT FOR  
CHRISTMAS GIFTS



## Photographers!

Adapt your camera to this Scope for excellent Telephoto shots and fascinating photos of moon!

## SPITZ JR. PLANETARIUM



er included FREE! Weight 3 lbs.

Stock No. 70,040-Q

SKY ZOO PROJECTOR fits above planetarium. Projects the outlines of mythological figures.

Stock No. 70,058-Q



## POCKET MICROSCOPE

Adjustable 20, 40, 60 POWER! A compact, imported, handy precision instrument of many uses. Select power you want, then focus sharply by turning special micro-focus ring. Good quality optics. Full satisfaction guaranteed.

Stock No. 30,005-Q

## ATTENTION SCHOOLS!

1/14 16mm. MOVIE PROJECTION LENS



F.L. only 17" or 1/2" of that standard 16mm projecting lens. Gives you a big picture—4 times the size normally obtained in same projecting distance. Lens unit is mounted in a standard sleeve with an O. D. of 1-3/16" which fits most 16mm. projectors. Brass tubing available to change O. D. for adapting to other sizes from 1" to 1 1/2". Direction sheet included. Back of the lens must come within 5/16" of film. Worth \$30.00. Projecting Lens—Stock No. 30,119-Q. \$9.50 postpd. Sleeve Adapter, 1" O.D.—Stock No. 40,126-Q. \$1.00 postpd.

## INSTRUCTION BOOKLETS

Easy to follow—accurate—8 1/2 x 11 page size—many illustrations. Do-it-yourself—Save! and have Fun!

How to Build Projectors	Stock No.	Price
Homebuilt Telescopes	9014-Q	30¢
Method to Clean Precision Optics	9006-Q	40¢
Homebuilt Riflescopes	9018-Q	40¢

NEW—JUST ISSUED	Stock No.	Price
How to Condense and Project Light with Lenses	9044-Q	75¢
Reticles and Their Uses	9039-Q	45¢
ULTRA CLOSE-UP Photography	9042-Q	60¢
Infra-red Light and Its Uses	9040-Q	75¢
Homemade Stereo-Adapters	9032-Q	30¢
Homemade Stereo-Viewers	9034-Q	30¢
Photo Micrography with Pen Microscope	9029-Q	10¢
Dummy Camera	9026-Q	20¢
Collimating Systems	9047-Q	35¢
"Building a Condenser Enlarger"	9038-Q	40¢

"ALL ABOUT TELEPHOTO LENSES" 21 pages—wealth of information, diagrammed instructions. Tells how to build Telephoto attachments—how to use them. Lots of other good dope on Telephotography. Stock #9036-Q. . . . . 60¢ Postpd.

Order by stock No. Send Check or M.O. Satisfaction Guaranteed!

EDMUND SCIENTIFIC CORP., BARRINGTON, N. J.

## OPTICAL BARGAINS

... See the Stars, Moon, Planets Close Up!

BUILD A BIG 100 POWER  
3" REFLECTING TELESCOPE

... with this Complete 87 Piece "Do-it-yourself" Kit

## EXCELLENT SCIENCE CLUB PROJECT!

Everything you need! No machining! Easily assembled! We furnish complete, simple instructions. Kit includes: 3" f/10 aluminized and over-coated Spherical Mirror—60X Eyepiece and 100X Barlow Lens—Cross-line Finder—sturdy 40" Tripod—fork type Equatorial Mount with locks on both axes—ventilated 3" Mirror Mount—heavy wall, black Telescope Tube. All nuts and bolts supplied. Nothing extra to buy. Our 3" Spherical Mirror (30" f.l.) is guaranteed to resolve detail right up to theoretical limit. Your finished scope can also be used terrestrially. Money-back guarantee. Shipping weight, 10 lbs.

Stock No. 85,025-Q. . . . . \$29.50 f.e.b. Barrington, N. J.

50-150-300 Power  
MICROSCOPE

Low Price Yet Suitable for Classroom

Use! Only \$14.95

3 Achromatic Objective Lenses on

Revolving Turret!

Imported! The color-corrected, cemented achromatic lenses in the objectives give you far superior results to the single lenses found in the microscope selling for \$9.95! Results are worth the difference! Fine rack and pinion focusing. Stock No. 70,005-Q. \$14.95 Postpaid

New! 2 in 1 Combination!

Packet-Size

50 POWER MICROSCOPE

and

10 POWER TELESCOPE

ONLY

\$4.50

ppd.



Useful Telescope and Microscope combined in one amazing, precision instrument. Imported! No larger than a fountain pen. Telescope is 10 Power. Microscope magnifies 50 Times. Sharp focus at any range. Handy for sports, looking at small objects, just plain smooching. Send Check or M.O. Satisfaction Guaranteed

Order Stock No. 30,059-Q. . . . . \$4.50

"MAKE-YOUR-OWN" 4 1/2" MIRROR KIT—Polished and aluminized mirror, lenses for eyepieces and diagonal. No metal parts.

Stock No. 50,074-Q. . . . . \$16.25 Postpaid

## SIMPLE LENS KITS!

Fun for adults! Fun for children! Kits include plainly written, illustrated booklet showing how you can build lots of optical items.

Stock No. 2-Q	10 lenses	\$ 1.00 Postpaid
Stock No. 5-Q	45 lenses	\$ 5.00 Postpaid
Stock No. 10-Q	80 lenses	\$10.00 Postpaid

## RAISE MONEY FOR YOUR CLUB!

## SELL POCKET HAND WARMERS



You Buy at Low Price of 50¢ Each—Sell for \$1.00! (Regular \$2.49 Seller)

No wires! No batteries! No flame! Yet gives off warming heat for 24 hours at a filling. Uses ordinary lighter fluid. Used over and over again. Made of sturdy aluminum. Carrying bag and full directions included. You must order 48 units or more to get 50¢ price. Single sample Hand Warmer for inspection—\$1. Order by stock No. Send check or M.O. Satisfaction guaranteed!

Stock No. 98-Q. Single Hand Warmer \$1.00 Postpd.

GET FREE CATALOG #Q—World's largest variety of Optical Items. Bargains galore... War Surplus—Imported—Domestic! Microscopes, Telescopes, Hand Spectroscopes, Prisms, Lenses, Reticles, Mirrors and dozens of other hard-to-get Optical Items. Ask for FREE CATALOG #Q.



### The Water Boatman

► THE U. S. GOVERNMENT recently awarded a patent for the invention of a combination airplane-submarine. The designing of this new mechanical marvel must be considered a great engineering feat. But still—Mother Nature had it first.

As a matter of fact, submarine-aircraft combinations are found over and over again among the semi-aquatic animals. The water boatman (Corixidae), shown in the picture, is a prime example.

As a submarine, this insect is superb. He can dart with amazing speed through the water, propelled by his flattened, elongated hind legs which he works like a set of oars. When he swims, the two front pairs of legs are hugged closely to the body to achieve streamlining.

The water boatman can remain under water for great lengths of time, because of his novel arrangement for storing oxygen. The upper surface of his abdomen is slightly sunken, to form a small basin. When the water boatman surfaces, a fresh supply of air enters this basin, which is sealed from the top by the tight-fitting wings. The insect can then breathe under water by drawing from this reservoir.

There is also a thin envelope of air surrounding most of his body, caused by thousands of tiny hairs which trap and hold air bubbles. Some experts believe that the water boatman is able to stay under water indefinitely in well-aerated water by an exchange of oxygen from the water through the surface of the air envelope.

The water boatmen are strong flyers and can take off easily from the surface of the water. They often mill around bright lights at night. Occasionally they invade open-air swimming pools by an aerial attack, where they may freely bite the bathers.

In Mexico, water boatmen eggs are so plentiful that they furnish food for the natives, and adults there are captured in such large numbers that they are dried and exported by the ton as food for poultry, song birds and fish!

Most waterboatmen species—there are some 300 of them—lay great quantities of eggs, attaching them to stalks of water plants. One of them, however, habitually attaches its eggs to the body of crayfish.

Science News Letter, November 5, 1955

### MEDICINE

## Sex Hormones Pass From Mother to Unborn Baby

► HORMONES circulating in the body of an expectant mother can cross a membrane barrier to the unborn baby's body and there affect the baby's organs.

This finding, which is contrary to current belief, was announced by Drs. William B. Ober, Charles C. Roby, Jay Bernstein and James E. Drorbaugh of Boston (Mass.) Lyin-In Hospital at the meeting of the American Society of Clinical Pathologists in Chicago.

In the uterus and ovaries of newborn baby girls who died shortly after birth the doctors found changes resembling those produced during the second half of the monthly female cycle. They also found changes in the lining of the uterus in unborn babies, pointing to a response to the female hormone progesterone.

Small quantities of another female sex hormone, pregnanediol, were recovered from the urine of newborn boy babies. And the ovaries of girl babies who died shortly after birth showed a number of changes suggesting that even before the baby is born hormones can act on the sex organs and stimulate development of ova, or germ cells, and their surrounding tissues.

Science News Letter, November 5, 1955

## Questions

ANTHROPOLOGY—What is a new technique of dating ancient man? p. 294.

□ □ □

ASTRONOMY—What causes the strong yellow line in the sun's corona? p. 291.

□ □ □

CHEMISTRY—How is nitromethane made into a fuel? p. 297.

What have scientists done with a virus for the first time? p. 292.

□ □ □

MEDICINE—Can you give artificial respiration to a baby? p. 295.

□ □ □

Photographs: Cover, University of California; p. 291, General Electric Company; p. 293, (1) McKague, Toronto and (2) American Public Health Association; p. 304, Eastman Chemical Products, Inc.

## SURPLUS TOOL BARGAINS

### 41 SURPLUS TWIST DRILLS

\$2

For hand or electric drills. Brand new genuine hardened carbon tool steel drills from 1/16" through 1/4". Each drill designed and tempered to give up to 1800 drillings through steel, aluminum, iron, wood, plastic. Sells in the stores for up to \$6. Set of 41 drills \$2.00.

### 5 PLIER SET

For jewelers, optical workers, hobbyists. These superb German instruments are of drop-forged, high-quality tool steel. All working joints with just right tension. Jaws meet perfectly to safely and securely hold most delicate objects. Each plier is 4" long and a veritable gem of precision and strength.

75¢ each FOR \$3.50

FLAT NOSE

ROUND NOSE

DIAGONAL

SNIP

COMBINATION

### NEEDLE FILES

Made from the best quality tool steel, designed for mechanics, watch, jewelry craftsmen. Compartmented plastic kit contains 5 1/2" needle files with round shanks and high test cutting qualities: round, half-round, flat, oval, knife, square.

98¢ complete set postpaid

### POWER Auger Bit

Made of finest tool steel specially tempered and hardened to give clean, easy drilling. Shanks fit all electric drills. Packed in sturdy plastic tool roll. Sizes: 3/8", 1/2", 5/8", 3/4", 7/8" and 1".

\$1.98

### 11 Pc. Drafting Set

High lustre chrome plated instruments of outstanding quality and accuracy. Set includes Plain and Ringhead Bow Dividers, Compasses for use with ink or pencil, Ruling Pen and all necessary parts. Packed in a velvet lined, snap button closure, simulated leather case.

\$3.29

### HOW TO ORDER

Send check or money order with name and address. We pay postage. If C.O.D., you pay postage and C.O.D. charges. Money back guarantee protects you fully. Rush orders today.

SCOTT MITCHELL HOUSE, INC.

611 B'way, Dept. 2411 New York 12, N. Y.

## MEDICINE

## Peroxide Bubbles Help Find Ulcers and Cancer

► STOMACH ULCERS and cancers that are hard to find by ordinary examinations may be detected with the help of hydrogen peroxide bubbles, Drs. Cesare Gianturco and George A. Miller of Urbana, Ill., reported at the meeting of the American College of Gastroenterology in Chicago.

Hydrogen peroxide bubbles when it comes in contact with an ulcerated surface, blood or pus, they explained. For detection of stomach ulcers or cancer, the hydrogen peroxide is mixed with barium, a commonly used contrast medium for X-ray examination.

The patient swallows the mixture. The bubbling action, which will come in about 20 to 30 seconds, can be seen on the fluoroscope screen.

When there is blood and pus in the stomach, regardless of the origin of these materials, there is abundant foam, the X-ray specialists reported. In the absence of blood and pus, the foaming is proportional to the size of the ulcerated surfaces.

The best reason to use the hydrogen peroxide is when the doctor suspects the patient has an ulcer at the lower end of the esophagus, which is the food passage between the throat and stomach, or when he suspects a cancer at the upper end of the stomach.

These two conditions are hard to detect by ordinary examinations. The bubbling of barium in hydrogen peroxide may show that a spasm of the upper opening of the stomach is hiding a cancer.

The bubbling technique was first described in a Stockholm, Sweden, medical journal in 1953. The Urbana doctors have used it in 55 patients and found it useful in a supplementary and limited way.

Science News Letter, November 5, 1955

## METEOROLOGY

## Palm-Sized Device To Predict Weather

► THE NAVY is testing a miniature weather station that can substitute for permanent stations during combat.

The station is designed to record data automatically in both total darkness and under severe weather conditions. It weighs six pounds and stands 23 inches. The Navy states that the set can be held in one hand.

Intended for use on board ships, the station's dials can be set automatically in a matter of minutes by its own sensing elements to measure and record surface atmospheric pressure, temperature, relative humidity, wind speed, as well as direction.

The equipment was developed for the Navy's Bureau of Aeronautics by the Fricz Instrument Division of the Bendix Aviation Corporation.

Science News Letter, November 5, 1955

## SAVE ON PALLEY'S NEW & SURPLUS VALUES

**NEW 100-200-300 POWER MICROSCOPE**  
**NOW ONLY 895**  
Compares to instruments selling up to \$75.00



An UNSURPASSED VALUE! Has fine ground and polished achromatic lenses. Precision ALL-METAL construction - this is NOT A TOY! The triple, revolving objective lens turret will allow you to select a 100X - 200X or 300X magnification. Has right or left hand rack and pinion adjustment for smooth, precise movement. Body inclines 90°. Adjustable plano sub-stage mirror. Complete in sturdy, dovetailed hardwood case. Your satisfaction FULLY GUARANTEED or money refunded.



## NEW ARMY SURPLUS 178mm F:2.5 CAMERA LENS

Originally designed for use on the K-21 and K-24 Aerial Cameras. A genuine EASTMAN AERO EKTAR 178mm lens. Has speeds from f:2.5 to f:16. Focal length is 7 inches. This amazing lens is NEW - in original case. Guaranteed perfect condition. Excellent for Color or Black and White. Exceptionally fine for night work or in poor light conditions. Comes with 2 filters - 1 Polarized (for haze) and 1 yellow, plus a filter adapter, a lens heater for high altitudes and a lens dust cap. Can be adapted to 35 mm or Speed Graphic Cameras as a Telephoto lens (see below).

**SPEED GRAPHIC ADAPTERS for above lens -**  
Includes Lens Board, Extension Tube and Bell Support.  
2-1/4x3-1/4" **2175** 3-1/4x4-1/4" **1875**  
4x5" **1475**



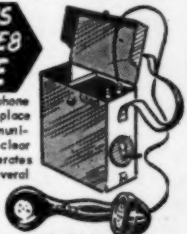
## ARMY PANORAMIC SCOPE

Originally used as a gun sighting scope on tanks. Objective head lens revolves through 360° and tilts through an angle of approx. 30 degrees. Tube assembly contains 11/16" x 3" dove prism. Eye piece is 1" Kellner and eyepiece assn. has a 50° Roof prism. Has crosshair reticle. Approx. 4 power. Use for range-finder, view-finder.

**595**

## GOV'T SURPLUS SIGNAL CORPS EEB FIELD PHONE

Easy to operate. A private phone or intercom system. Use any place that portable two-way communication is desired. Gives clear reception up to 15 miles. Operates on two standard batteries. Several phones may be used on the same line. Set contains a ringing generator, leather carrying case and phone. Each set reconditioned and checked-out.... price each COMPLETE CIRCUIT - Set of two... **1495 EA. 2950**



## MODEL GF-II and RU-16 RADIO TRANSMITTER AND RECEIVER

A tremendous Government Surplus Bargain! ALL NEW in original box. Consists of a type CW-5263A Transmitter - 2000 to 9050 KC, a CW-4051A Receiver - 195 to 13575 KC range, plus all transmitter and receiver coils and boxes. A Dynamotor-Filter unit, Antenna Relay, Transmitter Control Box, Receiver Switch Box, Receiver Remote Tuning Control, plus all tubes and spares. Complete and ready to operate on 12 volt current. Has 71 page manual and wiring diagrams. Made by Western Electric for U.S. Navy. Quantity limited - Order NOW!

**9950 NEW**

## PALLEY SUPPLY CO.

2263 E. VERNON AVE., DEPT. 14L  
LOS ANGELES 38, CALIF.

## IMPORTED 1500X RESEARCH MICROSCOPE \$18950



Compares to instruments selling up to \$250

For BACTERIOLOGY - HISTOLOGY - PATHOLOGY BIOLOGY - BOTANY - ETC.

Top Quality, professional instrument. Has a triple revolving turret with three precision ground and polished achromatic objective lenses - 10X, RPX and 100X oil immersion. Plus three Huygenian eyepieces of 5X, 10X and 15X giving up to 1500 power magnification. Has a sturdy, lifetime metal body which inclines through 90° for micro-photography. Rack and pinion control. Fine focusing adjustment. Large, 120 mm x 113mm square stage which holds slides up to 3"x2". Sub-stage has an Abbe two-lens divisible condenser with iris diaphragm and rack & pinion motion. Complete in a fitted professional type carrying case with lock and key.

Satisfaction GUARANTEED or Your MONEY REFUNDED!

**ONLY 6950**

35 MM ADAPTERS FOR ABOVE LENS - Complete - no other parts to buy. Will focus from 8 ft. to infinity - setting marked on the mount.  
LEICA - CONTAX S&D - EXACTA... **8950**  
CONTAX 2A... \$109.50 HASSALBAD... \$139.50



## SELF-CONTAINED VICKERS HYDRAULIC TRANSMISSION

Gives Constant Torque at all speeds with a variable volume, reversible piston pump which

supplies a piston type hydraulic motor. Has 2 H.P. automatic pressure dash pot for smooth control. Power output RPM is 0 to 1/3 input RPM in both directions. Input RPM is 1800 PSI continuous - 4000 RPM intermittently. Ideal to use for Drives, Lifting, Duplicators on Mills, Conveyors, Small Cars, etc. . . . **4450**

A War Surplus Bargain... Order Now

4" SPLINE SHAFTS for power input and take-off on above transmission. Per pair... **250**

## INPUT AND TAKE-OFF PLATE ASSEMBLY

To adapt above transmission to a pulley drive. Has self-lubricating, high speed bearings. 1/2" keyway shaft.

Price per set... **ONLY 2000**

## 180° OFFSET DRIVE

Excellent for use where tremendous power at low take-off RPM is desired. Has 6 gears, rotating on self-lubricating, high speed bearings. 85 to 1 gear ratio. Shafts are 1-1/4" x 3/8" diameter. New Surplus!



**NEW 1295**

## 12 Pz. IMPORTED FILE SETS

In demand by Technicians, Model Makers, Repairmen, Hobbyists, etc. Made of finest quality, tough file steel. Specially hardened and accurately machined for precise filing. Set of 12 assorted shapes. A \$5.00 Surplus Value... **295**

## 0-30 AMMETERS

NEW! Made to rigid Government Specs. . . **ONLY 395**

ORDER FROM THIS AD - Pay by Money Order or Check. P.O.s accepted from well rated D&B firms. 1/2 deposit with all C.O.D.s. Prices are F.O.B. our warehouse in Los Angeles.



# New Machines and Gadgets

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N ST., N.W., Washington 6, D. C., and ask for Gadget Bulletin 803. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

✿ **FLYING SLED** looks like a bright salad bowl. Made of plastic, the disk is designed for children's use in the winter or at the beach. A rope can be attached for pulling. It's available in green or orange.

Science News Letter, November 5, 1955

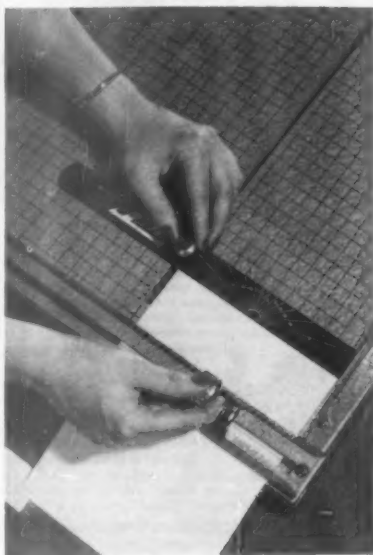
✿ **ALL-PURPOSE PUMP** made in England can handle oil, tar, jam, beer, glue, soap, water, or grease. Available in seven sizes with outputs ranging from 720 to 36,000 gallons an hour, the pump is made so that the fluid is separated from the bearings.

Science News Letter, November 5, 1955

✿ **WATCH ALARM** wakes up hard-of-hearing persons by touch. When it goes off, its special vibrating back buzzes the wearer awake without disturbing anyone else. It can also be used as an ordinary wrist watch and has equal value for people with normal hearing.

Science News Letter, November 5, 1955

✿ **PAPER CUTTER**, described as safe for use in elementary schools, has a hidden blade. The cutting edge is an easily changed standard razor blade fixed to the underside of a knob in a transparent cutting channel. The steel board, shown in the photograph,



is available in four sizes from 12 to 24 inches.

Science News Letter, November 5, 1955

✿ **PLASTIC WEATHERSTRIPPING** for the do-it-yourself enthusiast comes in special kits complete with tacks and special cement. The stripping molds itself to windows and doors and is very resistant to abrasion and scuffing. Also in this weatherstrip line is a house door-bottom weatherseal made from heavy aluminum and plastic.

Science News Letter, November 5, 1955

✿ **CANDLE COASTERS** are made of clear plastic. Three inches in diameter, they are slightly dished in shape. Pushed up on the lower end of the candle, they support it in an upright position and also prevent wax from dripping on tables or linens.

Science News Letter, November 5, 1955

✿ **FISH HOOK** guards are single or multiple pockets made of plastic. Isaac Waltons can place their barbed hooks in the holders for safekeeping and, at the same time, save skin and clothes from being snagged on the hooks.

Science News Letter, November 5, 1955

✿ **ELECTRICAL** cable stretches over twice its own length. With a current carrying capacity of five amps and a resistance of one and one-half ohms, the cable can be used for electrical extension cords.

Science News Letter, November 5, 1955

"Here is a volume to justify the publisher's hope that it may be a useful step toward bridging the gap between science and the humanities . . ."

## CHARLES DARWIN AND THE GOLDEN RULE

By William Emerson Ritter

"It is especially interesting, after reading two recent and excellent books . . . both of which deal in the modern mode with sex, robustly and without inhibition, to see how effectively

William Ritter gets the job done within the bounds of a delicacy and restraint now often considered passé."

—The American Naturalist.

Order your copy through

### SCIENCE SERVICE BOOK DEPARTMENT

1719 N ST., N. W.

Washington 6, D. C.

☐ I enclose \$5.00

☐ Please bill me

11-5-5

Mail to my address as imprinted on the left

## Do You Know?

Britons are fighting flooded airfield runways with a new device that can suck up 500 gallons of water at a time.

The first planetarium of Latin America was recently inaugurated in Montevideo.

Face shields, aprons and spats that reflect the heat right back to the hot surfaces have enabled men to change doors on a furnace heated to 2,100 degrees Fahrenheit.

A live sponge one-half inch in diameter and four inches long draws 24 quarts of water through its body daily, straining out the food organisms.

Equipped with after-burner, the powerful Olympus jet engine can produce as much as 25,000 pounds thrust.

The operating temperature range of new silicone lubricants is from 100 degrees below zero to over 400 degrees Fahrenheit.

Today's rate of energy consumption in terms of coal is estimated to be about 8,000,000,000 tons a year.